

CHAPTER 1 - PURPOSE AND NEED FOR ACTION

1.1 PURPOSE

The Tennessee Valley Authority (TVA) has prepared this draft Environmental Impact Statement (EIS) in accordance with Council of Environmental Quality regulations and TVA procedures for implementing the National Environmental Policy Act (NEPA). The purpose of this EIS is to identify and evaluate a range of ways to address flooding effects of Nolichucky Dam and the accumulated sediment in Nolichucky Reservoir on land and property not owned by the federal government.

1.2 BACKGROUND

Facilities

The Nolichucky River watershed includes parts of Avery, Mitchell, and Yancey counties in western North Carolina, and parts of Cocke, Greene, Hamblen, Jefferson, Unicoi, and Washington counties in eastern Tennessee (Figure 1). Nolichucky Dam is located at Nolichucky River Mile 46, about 7.5 miles south of Greeneville, in Greene County, Tennessee. Nolichucky Reservoir, also known as Davy Crockett Lake, extends upstream about six miles from the dam (Figure 2). Nolichucky Dam is a concrete, gravity overflow structure, (now) 482 feet long and 94 feet high. The powerhouse measures 59 feet by 104 feet and is located on the right bank of the river just downstream from the intake structures in the dam.

Nolichucky Dam was built by the Tennessee Eastern Electric Company as a single-purpose hydropower production project. The original project, which began operation in 1913, included the dam with a concrete overflow spillway at a crest elevation of 1210.4 feet and the powerhouse containing two generating units and spaces for two additional units. In 1923, the spillway section was raised by approximately 30 feet, 7-foot high flashboards were installed (raising the pool level to elevation 1247.9), and the other two generators were installed. Later, the height of the flashboards was reduced to five feet (adjusting the pool level to elevation 1245.9). The four vertical



Figure 1. Nolichucky River watershed in Tennessee and North Carolina.

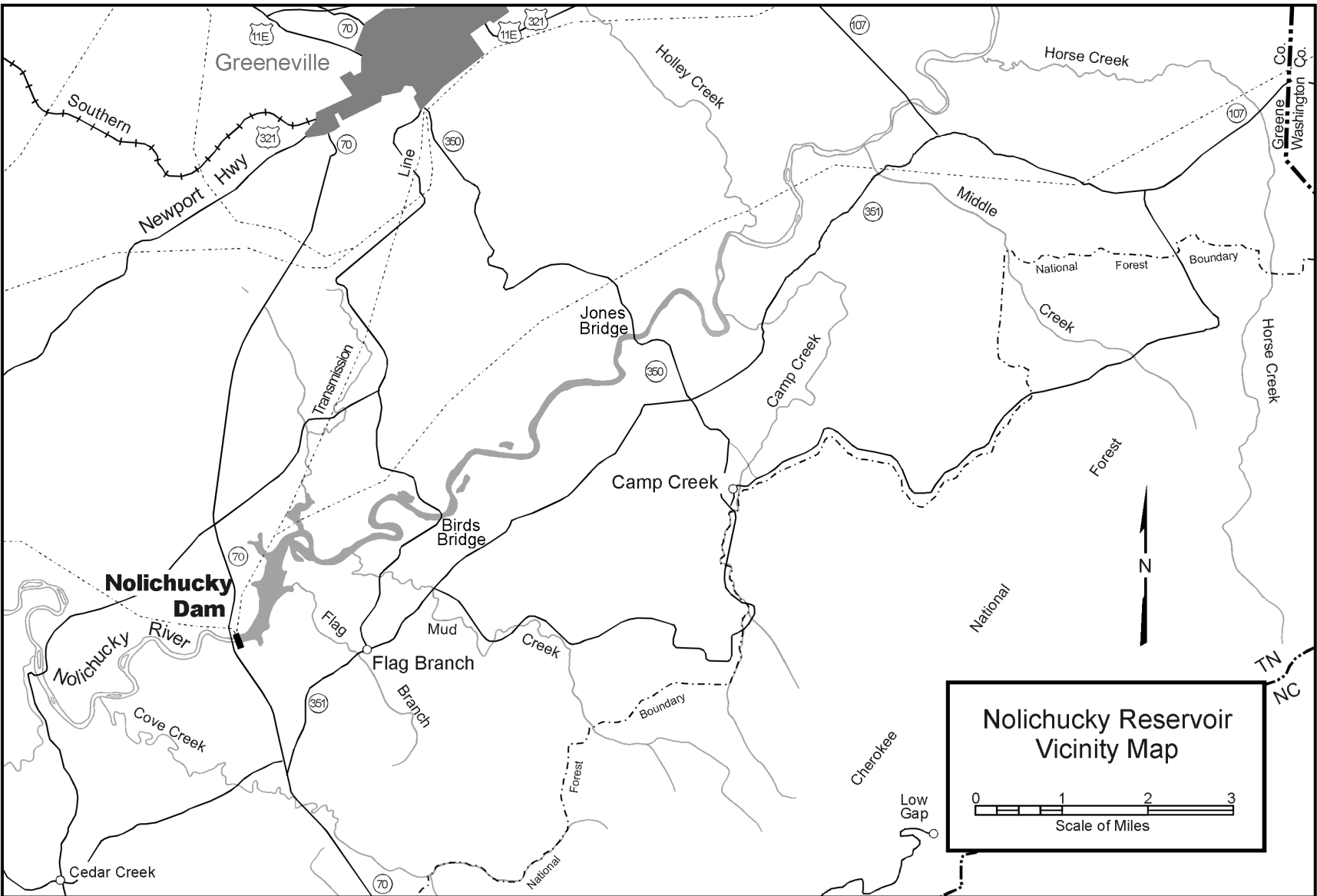


Figure 2. The area around Nolichucky Reservoir.

Francis electric generators in the powerhouse have a total nameplate capacity of 10,640 kilowatts.

All of the Nolichucky Project facilities and rights were acquired by the East Tennessee Light and Power Company in 1929, and were acquired by TVA in 1945 (TVA 1972). When TVA acquired the Nolichucky Project, the purchase included Nolichucky Dam and Powerhouse, the switchyard, title to approximately 750 acres of land around and under the reservoir, and flowage easements over an additional 300 acres adjacent to the reservoir.

Mining and Sedimentation

Commercial surface mining of mica and kaolin in the Nolichucky River watershed began during the 1870s in Yancey, Mitchell, and Avery counties, North Carolina. The first large grinding mills began production in the early 1900s and processing plants for feldspar appeared in the area around the late 1940s (Duda and Penrose 1980).

Unusually large amounts of sand and silt have existed in the river and reservoir upstream from Nolichucky Dam for many years. A 1945 report expressed concern that “silt-laden water from ore washing operations . . . might possibly have some effect upon the development of certain types of fish”, but no specific information was available (Scott and Jones 1945). Legislation enacted by the State of North Carolina in the late 1950s resulted in reducing sediment loads, but accumulations continued from previous river deposits. The conclusions from a 1959 Tennessee study included these statements:

“Silt and mica deposits several feet in depth were evident on the banks in numerous areas as far downstream as Tusculum . . . immediately above backwater in Davy Crockett Lake. Much of the remaining silt and mica settle out in this body of water. The capacity of this lake has already been greatly reduced, and will eventually be destroyed unless siltation is drastically reduced.” (Mullican, et al. 1960)

Mining practices were largely unregulated until 1965 when the federal Water Quality Act was passed. This act and its later revisions led to regulation of the point-source discharges from the processing plants; however, much of

the material removed in the water treatment process, along with mine tailings, was dumped on the floodplain where it was subject to washing and sliding into the river. No measures were taken to isolate plant or mine activities from the effects of storm water until North Carolina enacted the Mining Act of 1971, which required reclamation and erosion control management practices on surface mines.

From 1980 to 1985, government agencies and local landowners cooperated in the successful reclamation of 590 acres of land that had been mined before the 1971 Mining Act (Muncy, 1985). Privately financed reclamation continued after this program ended, and nearly all the land in need has been reclaimed (Cliff Vinson, Natural Resources Conservation Service, personal communication). Production of mica, feldspar, and olivine in the area continues to be a major part of U.S. supplies and shows no signs of slowing.

Over the years, TVA has taken measurements of the bottom surface elevation in and along Nolichucky Reservoir several times to estimate how much sediment has been deposited. In 1938, when the first measurements were taken, TVA estimated that approximately 7,300 acre-feet (11.8 million cubic yards) of sediment had accumulated in the reservoir. By 1970, the estimates indicated that approximately 17,400 acre-feet of sediment was present. In 1999, when the most recent measurements were taken, the sediment deposits were estimated at about 19,000 acre-feet (30.6 million cubic yards). Based on some probing and calculations made in 1938, the original volume of the valley in which Nolichucky Reservoir was built has been estimated to include about 18,000 acre-feet at elevation 1240.9, 21,750 acre-feet at elevation 1245.9, and about 26,000 acre-feet at elevation 1251.0. The 19,000 acre-feet of sediment estimated to be present in 1999 occupies about 90 percent of the reservoir volume below elevation 1240.9 (the present pool level) and about 73 percent of the space in the valley below elevation 1251.0 (the highest elevation included in the silt ranges). The water in Nolichucky Reservoir now occupies only about 10 percent of the reservoir volume and any flood water coming through this part of the river valley must go over or around all of the accumulated sediment. [More detail about the accumulated sediment is presented in Section 3.4.]

Project Modifications and Recent Studies

In June 1964, inspections and stability investigations indicated the spillway in Nolichucky Dam did not meet safety standards in force at that time. As a result, the flashboards were removed from the top of the dam to lower the reservoir level to elevation 1240.9. In November 1965, the Unit 4 generator was removed from service because of damage to the intake gates and trash racks. Unit 3 was removed from service in August 1969, when the generator stator coil failed, and Unit 2 was taken out of service in September 1969, when a leak developed in the penstock. The last generating unit (Unit 1) was taken out of service in August 1972 because the cost of necessary repairs could not be justified economically (TVA 1972).

In 1972 and 1973, additional concrete was placed on the downstream face of the dam to provide structural stability, and a gate 10 feet high and 25 feet wide was installed to permit small drawdowns of the reservoir. The spillway crest of this new gate was at elevation 1230.9. In addition, the penstocks and sluiceway were plugged with concrete, effectively retiring the power facilities. Management of the Nolichucky Project shifted to developing and maintaining a waterfowl sanctuary and an environmental education center on the reservoir. In the mid-1970s, TVA enhanced the waterfowl sanctuary area by acquiring fee title to 330 acres of land which had been covered by flood easements and fee title to an additional 163 acres adjacent to the downstream part of the reservoir. Later, formal agreements were signed with the Tennessee Wildlife Resources Agency (TWRA) and Cedar Creek Learning Center to manage the wildlife management area and environmental education facility, respectively. In 1995, a reinforced concrete bulkhead was constructed on the upstream side of the spillway gate, rendering the gate inoperable and stabilizing the pool level at 1240.9.

In 1998, partly in response to letters and questions from local property owners, TVA began reviewing the areas around Nolichucky Reservoir that would be affected during flood events. Cross sections of the reservoir were surveyed at locations where previous sediment volumes had been determined. These data, along with flow data for various possible flood events, were used to develop a hydraulic model of the reservoir. This mathematical model provided predictions of flood elevations that would occur

under present conditions. The model also was used to estimate reservoir and flood conditions as they would have been when TVA acquired the project in 1945. Elevations were computed using this model and the results were compared to the present flood elevation data. The results of these evaluations indicated that, in some areas, silt accumulations in the reservoir have raised the 100-year flood level [see Section 2.3 for a definition and much more about this term] by as much as 10 feet above what it probably would have been in 1945 (Figure 3). The study also showed that even in 1945, the project landrights did not include all of the area which would have been impacted by Nolichucky Dam during flood events. Based on these results, TVA decided to prepare this EIS to evaluate alternative ways of addressing the flooding on non-federal lands around Nolichucky Reservoir.

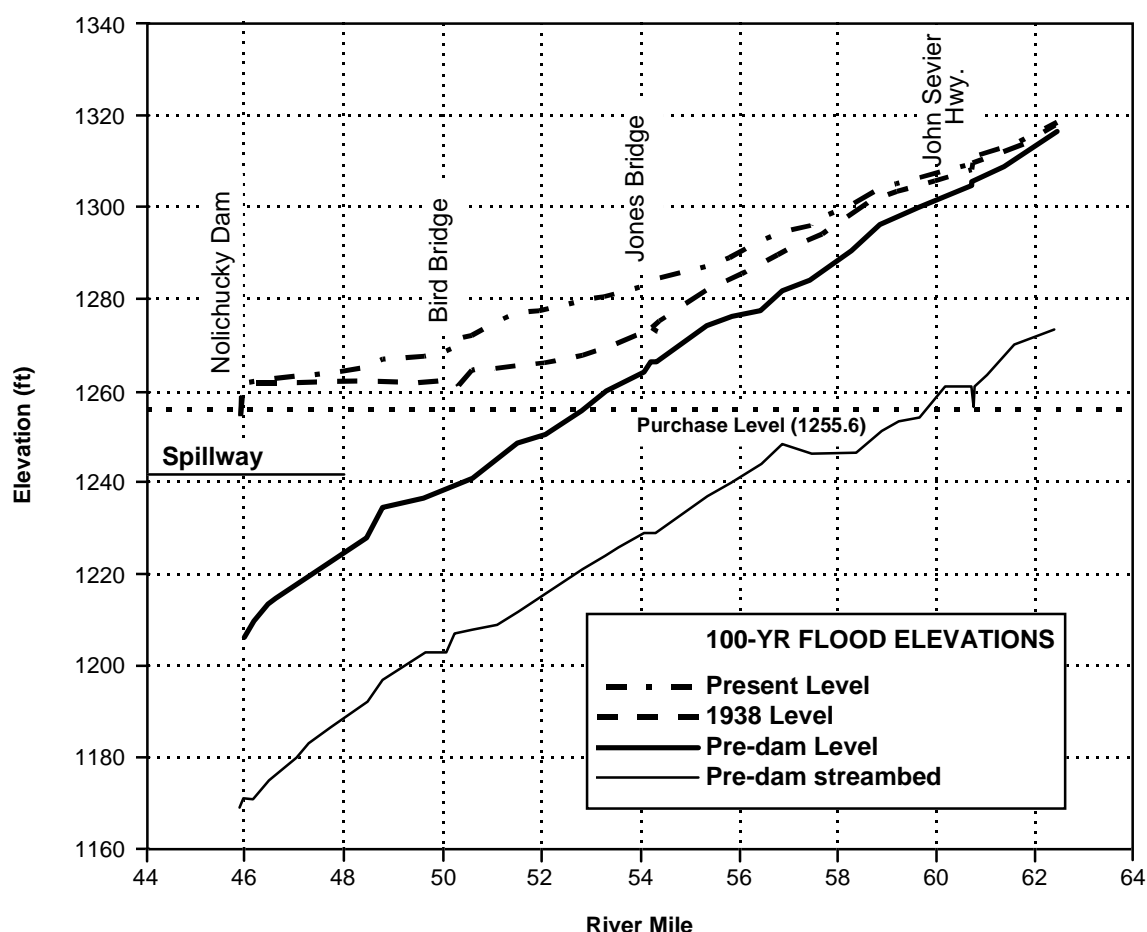


Figure 3. Comparison of the present 100-year flood profile and the estimated 1938 100-year flood profile along part of the length of the Nolichucky River.

1.3 DECISION TO BE MADE

TVA will use the results of this evaluation to decide how to address the potential flooding effects that could be caused by the presence of Nolichucky Dam and the accumulated sediment in Nolichucky Reservoir on land that is not owned or covered by easements held by the federal government.

1.4 SCOPING PROCESS

Public participation in determining the scope of this EIS began in early January, 2000, when TVA mailed letters describing the project to over 300 owners of land adjacent to Nolichucky Reservoir and to representatives of agencies and Indian tribes which might be affected or interested. On January 12, 2000, a Notice of Intent was published in the *Federal Register* (Volume 65, Number 8, pages 1940-1941) indicating that TVA would prepare this EIS and inviting interested parties to comment on its scope. The letters and Notice of Intent also indicated that public and agency scoping meetings would be held on January 20, 2000, to receive oral comments on the project, and that written comments should be submitted by February 21, 2000.

Two federal agencies and two state agencies were represented at the agency scoping meeting. Fifty-two people registered at the public scoping meeting. At both meetings, TVA described the purpose and background of this project, then invited the participants to suggest issues (subject areas) and possible alternatives which should be included in the EIS. Ideas and suggestions from the attendees were captured on flipchart pages and people were encouraged to turn in the worksheets they used during the meetings.

In addition to the results from the agency and public meetings, TVA received a total of nine letters, e-mails, and telephone messages concerning the scope of this EIS. These additional sets of comments represented input from one other federal agency, one non-governmental organization, and seven individuals. All of the oral and written comments were used to develop a Scoping Document for this project, which was distributed to agencies and the public in March 2000.

1.5 ISSUES TO BE ADDRESSED IN DETAIL

All of the comments made by the public and various agencies about issues that should be addressed in this EIS were reviewed and sorted into a variety of apparent subject areas. Based on the extent of the comments and the nature of the project, four subject areas were identified as issues that should be discussed extensively in the EIS. During the preparation of the EIS, three other issues emerged that required detailed evaluations. The scope of each of these seven major issues is described as follows:

Land Rights/Land Use - The purpose of this EIS is to address impacts to land and property that are not in federal ownership or covered by appropriate easements. The EIS identifies the non-federal land around Nolichucky Reservoir that could be affected during large flood events and the present uses of that land. This EIS also describes the effects of each alternative on this non-federal land and other land in the watershed that could be affected.

Flood Risk/Floodplains - The primary focus of this EIS is the flooding effects that Nolichucky Dam and Reservoir have on land that is not in federal ownership. The EIS describes the kinds of impacts that could occur during large, wide-area flood events on the Nolichucky River if nothing is done and what the effects would be (both upstream and downstream from the dam) under each of the alternatives.

Sedimentation - The sediment in the reservoir has made the flooding impacts worse than they were when TVA bought the Nolichucky Project. This EIS describes the present sources of more than normal amounts of sediment in the watershed, sediment loading in the river, and the physical and chemical characteristics of the sediment that has accumulated in the reservoir. The EIS also describes what would happen to the sediment in the reservoir under each of the alternatives.

Wetlands - As the sediment has accumulated behind Nolichucky Dam, shallow areas have developed and plants normally associated with wetlands have begun to grow there. The EIS identifies the amount of wetland habitat that presently exists around Nolichucky Reservoir and what would happen to that habitat under each of the alternatives. The EIS also discusses the

potential effects of the alternatives on wetlands downstream from Nolichucky Dam.

Groundwater - If one or more of the alternatives involved lowering the water level in Nolichucky Reservoir, the groundwater level around the reservoir also could be affected, along with the level in any wells that draw from shallow groundwater sources. The EIS identifies this possibility and describes what would be done to address potential adverse effects under each related alternative.

Aquatic Life - Alternatives which would affect the water level and sediment in Nolichucky Reservoir also could affect the abundance and types of fish and other aquatic life that could occur in the reservoir and in the river downstream from Nolichucky Dam. The EIS summarizes what is known about the types of aquatic animals that occur in this part of the Nolichucky River and describes the effects on those species that could occur if each alternative was adopted.

Endangered Species - Several federal- and state-listed endangered or threatened species are known to occur in areas which could be affected by one or more of the alternatives. Federal agencies are required to determine the possible effects of their activities on listed species and to protect and promote the recovery of listed species whenever possible.

Other issues identified during the scoping process also are included in this EIS; however, they are not likely to require as extensive discussions as the seven major issues. This EIS includes succinct descriptions of the pertinent resource areas necessary to complete this analysis of environmental effects of the action and No Action alternatives.

1.6 STUDY AREA

The geographic area most affected by this project includes all of the land within the identified 500-year flood boundary around Nolichucky Reservoir, in southeastern Greene County, Tennessee (Figure 2). Some resource area discussions also include parts or all of the Nolichucky River watershed

upstream from Nolichucky Reservoir and some discussions include the Nolichucky River and its floodplain from Nolichucky Dam downstream to where it flows into the French Broad River in Douglas Reservoir (Figure 1).

1.7 RELATED DOCUMENTS

The environmental document most closely related to this project is the EIS TVA prepared in 1972 when the purpose of this project was changed. The title of that EIS is “Rehabilitation of the Nolichucky Project” (TVA 1972). In 1999, TVA issued an Environmental Assessment on a proposal to mine sand from Nolichucky Reservoir (TVA 1999). Other pertinent documents are mentioned in the text; those references are listed in Section 5.3.

1.8 REVIEW AND CONSULTATION REQUIREMENTS

A number of federal, state, and local laws and regulations could apply to one or more of the alternatives considered in this EIS. These laws and regulations are intended to provide safeguards against various types of impacts to the environment and other resources or activities in the area. Most of these laws and regulations would apply to specific construction activities; however, the nature of the reviews and restrictions could vary depending on the kind of action that was being proposed. Many of these regulations also include opportunities for public review and comment.

National Environmental Policy Act (NEPA)

NEPA, 42 U.S.C. 4321 et seq., requires all federal agencies, including TVA, to consider the potential environmental impacts of proposed actions before deciding whether to proceed. Under the TVA procedures for implementing NEPA and the regulations promulgated by the Council on Environmental Quality, there are three levels of environmental review: categorical exclusions, environmental assessments, and environmental impact statements (EIS). The kind of action and significance of the potential impacts dictate which level of review is to be used. Analyses become more detailed and public involvement more extensive as an agency moves from a review for a categorical exclusion to an EIS.

This EIS includes evaluations of the potential environmental effects which could occur under the alternatives evaluated in detail. These evaluations are intended to assist in deciding which alternative should be selected and to comply with NEPA requirements.

Construction Permit Reviews

The state of Tennessee requires potential dischargers of stormwater to obtain a National Pollutant Discharge Elimination System (NPDES) storm water runoff permit before site preparation and construction activities can commence. NPDES permit limits are set to protect water quality and water uses that have been identified by the state for stream reaches. The Environmental Protection Agency (EPA) has an opportunity to review and comment on proposed NPDES permits, as does the general public.

Under two of the alternatives (Alternatives C and D), NPDES stormwater permits probably would be required for specific components of the project. Compliance with NPDES construction and operational permit conditions would be required and monitored by the state.

Protection of Wetlands, Floodplains, and Streams

Because of the important functions wetlands provide, they are protected under federal and state laws. Before most wetlands can be disturbed, a permit must be obtained from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act. The EPA, federal and state agencies, and the public typically have opportunities to review and comment on the proposed permits. As part of the permitting process, Tennessee would be asked to determine whether the proposed action would violate state water quality standards. Under Executive Order No. 11990 (Protection of Wetlands), federal agencies are directed to avoid impacting wetlands with new construction to the extent practicable and to, otherwise, minimize potential wetland impacts. Alteration of streams is controlled at the state level by the Tennessee Aquatic Resource Alteration Permit program.

Under Executive Order No. 11988 (Floodplain Management), federal agencies are directed to avoid affecting or taking actions in floodplains to the extent practicable and to otherwise minimize potential impacts to floodplain

values. At the local level, Greeneville and Greene County have adopted regulations that are used to control development in floodplains.

This EIS includes evaluations of the action alternatives on wetlands and floodplains based on present knowledge about the resources and components of each project. Appropriate reviews and mitigation measures are identified that would protect these resources.

Cultural Resources

A number of federal laws protect cultural and archaeological resources, including the National Historic Preservation Act and the Archaeological Resources Protection Act. Before disturbing cultural and archaeological resources that have historical significance, TVA and other federal agencies are required to consult with the State Historic Preservation Officer, other affected parties, and, in some circumstances, the federal Advisory Council on Historic Preservation. The state of Tennessee also has adopted archaeological resource protection requirements for lands under the control of the state or local governments and for the excavation of the remains of Native Americans.

This EIS includes a review of existing information about archaeological and cultural resources in the area and an evaluation of the potential effects on those resources associated with each of the alternatives. Measures to comply with pertinent laws and regulations would be included in the final plans for the preferred alternative.

Endangered Species

Under the Endangered Species Act, 16 U.S.C. 1536 et. seq., federal agencies are to ensure that their actions are not likely to jeopardize the continued existence of any federal endangered or threatened species or adversely modify any critical habitat of such species. If a proposed action may affect an endangered or threatened species, the agency must consult with the U.S. Fish and Wildlife Service (USFWS) and obtain that agency's determination of the potential for impacting these species. In addition to the responsibilities of federal agencies, the Endangered Species Act prohibits the

“taking” (harming) of listed species by any person. The state of Tennessee also has established regulatory protections for state-listed species.

This EIS identifies the federal- and state-listed endangered and threatened species which are known or are considered likely to occur in this project area. The EIS also includes evaluations of the potential effects of the alternatives on these species. Once a preferred alternative is identified, appropriate measures will be taken to comply with the pertinent laws and regulations.

Farmland Protection

Under the Farmland Protection Policy Act, federal agencies are required to identify and take into account potential adverse effects of a proposed action on farmlands. In addition, the state of Tennessee has enacted the Agricultural District and Farmland Preservation Act, TCA §§43-34-101 - 108 (1995), which provides limited protection of farmlands that have been specially designated under the act. This EIS includes evaluations of the potential effects of the action alternatives on farmlands. The description of the preferred alternative, once one is identified, will include measures to comply with these requirements.

Environmental Justice

Executive Order (EO 12898) directs some federal agencies to consider whether the effects of their actions would cause disproportionate burdens on the health or environment of any segment of the human population. While TVA is not subject to this Executive Order, the EIS includes a discussion about where low income and minority groups live in the general project area and an evaluation of the likely effects of the alternatives on those segments of the population.

Other Review and Permit Processes

A number of other review and permit processes may be pertinent to one or more of the alternatives, depending on the nature of the specific proposals or their potential environmental effects. These include reviews under or involving the federal Safe Drinking Water Act, Tennessee drinking water regulations, and solid and hazardous waste laws and regulations. Appropriate review and compliance actions might be required under these

and other pertinent federal, state, and local laws and regulations before any of the action alternatives could be constructed and/or operated.

1.9 EIS OVERVIEW

This document follows a fairly standard EIS format. Chapter 2 presents a description of each alternative way of dealing with the flooding of non-federal land, a summary of the environmental effects which have been identified, and the status of identifying a preferred alternative. Chapter 3 presents a systematic description of the existing environmental features within the project area, and Chapter 4 presents a parallel description of the potential effects on those features which could occur if each alternative was adopted. Chapter 5 presents a variety of supporting information, primarily the list of preparers of this text, a glossary of terms, and the references used in this evaluation. The five appendices which follow the EIS text present detailed information not available from other sources.